



Complete Summary

GUIDELINE TITLE

ACR Appropriateness Criteria® dysphagia.

BIBLIOGRAPHIC SOURCE(S)

Levine MS, Bree RL, Rosen MP, Foley WD, Gay SB, Grant TH, Heiken JP, Huprich JE, Lalani T, Miller FH, Ros PR, Sudakoff GS, Greene FL, Rockey DC, Expert Panel on Gastrointestinal Imaging. ACR Appropriateness Criteria® dysphagia. [online publication]. Reston (VA): American College of Radiology (ACR); 2007. 6 p. [35 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Levine MS, Bree RL, Foley WD, Glick SN, Heiken JP, Huprich JE, Robbin ML, Ros PR, Shuman WP, Greene FL, Laine LA, Expert Panel on Gastrointestinal Imaging. Dysphagia. [online publication]. Reston (VA): American College of Radiology (ACR); 2005. 6 p. [33 references]

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

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SCOPE

DISEASE/CONDITION(S)

Oropharyngeal dysphagia

GUIDELINE CATEGORY

Diagnosis
Evaluation

CLINICAL SPECIALTY

Family Practice
Gastroenterology
Infectious Diseases
Internal Medicine
Neurology
Nuclear Medicine
Radiology

INTENDED USERS

Health Plans
Hospitals
Managed Care Organizations
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of initial radiologic examinations for patients with dysphagia

TARGET POPULATION

Patients with dysphagia

INTERVENTIONS AND PRACTICES CONSIDERED

1. X-ray
 - Barium swallow
 - Modified barium swallow
 - Dynamic and static imaging of pharynx
 - Biphasic esophagram (double contrast and single contrast)
2. Nuclear medicine, Technetium (Tc)-99m esophageal transit scintigraphy
3. Endoscopy
4. Esophageal manometry

MAJOR OUTCOMES CONSIDERED

Utility of radiologic examinations in differential diagnosis

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of peer-reviewed medical journals, and the major applicable articles were identified and collected.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not stated

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed for reaching agreement in the formulation of the appropriateness criteria. The American College of Radiology (ACR) Appropriateness Criteria panels use a modified Delphi technique to arrive at consensus. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table and narrative as developed by the topic leader(s). Questionnaires are completed by participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1 to 9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed

after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty percent agreement is considered a consensus. This modified Delphi technique enables individual, unbiased expression, is economical, easy to understand, and relatively simple to conduct.

If consensus cannot be reached by the Delphi technique, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible. If "No consensus" appears in the rating column, reasons for this decision are added to the comment sections.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

Guideline developers reviewed published cost-analyses.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria®

Clinical Condition: Dysphagia

Variant 1: Oropharyngeal dysphagia with an attributable cause.

Radiologic Procedure	Rating	Comments	RRL*
X-ray barium swallow modified	8		Med
X-ray pharynx dynamic and static imaging	6		Med
X-ray biphasic esophagram	4	Double contrast and single contrast	Med

Radiologic Procedure	Rating	Comments	RRL*
X-ray barium swallow	4		Med
NUC Tc-99m transit scintigraphy esophagus	2		Med
<u>Rating Scale:</u> 1=Least appropriate, 9=Most appropriate			*Relative Radiation Level

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 2: Unexplained oropharyngeal dysphagia.

Radiologic Procedure	Rating	Comments	RRL*
X-ray pharynx dynamic and static imaging	8	Both pharyngeal and esophageal exams needed, since patient may have referred dysphagia.	Med
X-ray biphasic esophagram	8	Both pharyngeal and esophageal exams needed, since patient may have referred dysphagia. Double contrast and single contrast	Med
X-ray barium swallow modified	6		Med
X-ray barium swallow	6		Med
NUC Tc-99m transit scintigraphy esophagus	4		Med
<u>Rating Scale:</u> 1=Least appropriate, 9=Most appropriate			*Relative Radiation Level

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 3: Substernal dysphagia in immunocompetent patients.

Radiologic Procedure	Rating	Comments	RRL*
X-ray biphasic esophagram	8	Endoscopy and biphasic esophagram are both excellent diagnostic tests in this setting. Double contrast and single contrast.	Med
X-ray barium swallow	6	Probably indicated if that is all the patient can do.	Med
X-ray barium swallow modified	4		Med
NUC Tc-99m transit scintigraphy esophagus	4		Med
X-ray pharynx dynamic and static imaging	4		Med
<u>Rating Scale:</u> 1=Least appropriate, 9=Most appropriate			*Relative Radiation Level

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 4: Substernal dysphagia in immunocompromised patients.

Radiologic Procedure	Rating	Comments	RRL*
X-ray biphasic esophagram	8	Endoscopy and biphasic esophagram are both excellent diagnostic tests in this setting. Double contrast and single contrast.	Med
X-ray barium swallow	5		Med
X-ray barium swallow modified	4		Med
X-ray pharynx dynamic and static imaging	3		Med
NUC Tc-99m transit scintigraphy esophagus	2		Med

Radiologic Procedure	Rating	Comments	RRL*
<u>Rating Scale: 1=Least appropriate, 9=Most appropriate</u>			*Relative Radiation Level

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Summary of the Literature

Dysphagia is defined as the subjective awareness of swallowing difficulty during passage of a solid or liquid bolus from the mouth to the stomach. This symptom can be caused by functional or structural abnormalities of the oral cavity, pharynx, esophagus, or even the gastric cardia. A barium study may be performed with videofluoroscopy to assess pharyngeal function and esophageal motility as well as a series of double-contrast and single-contrast static images to assess structural abnormalities such as rings, strictures, and tumors. Other possible diagnostic tests include a modified barium swallow, endoscopy, manometry, and nuclear scintigraphy esophageal transit studies. The choice of test may depend on the clinical setting as well as the nature and location of the patient's dysphagia.

Clinical Perspective

Many patients with dysphagia can subjectively localize a sensation of blockage or discomfort to the throat or substernal region. Patients with pharyngeal dysphagia typically complain of food sticking in the throat or of a globus sensation with a lump in the throat. Other symptoms of oropharyngeal dysfunction include coughing or choking during swallowing due to laryngeal penetration or aspiration, a nasal-quality voice or nasal regurgitation due to soft-palate insufficiency, and food dribbling from the mouth or difficulty chewing due to an abnormal oral phase of swallowing. When oropharyngeal dysphagia has an attributable cause (e.g., recent stroke), a modified barium swallow may be the appropriate test to assess the patient's swallowing status and initiate treatment by a speech therapist. In patients with unexplained oropharyngeal dysphagia, however, a more detailed barium study may be needed to determine the cause. It also is important to recognize that abnormalities of the mid or distal esophagus or even the gastric cardia may cause referred dysphagia to the upper chest or pharynx, whereas abnormalities of the pharynx rarely cause referred dysphagia to the lower chest. The esophagus and cardia should therefore be evaluated in patients with pharyngeal symptoms, particularly if no abnormalities are found in the pharynx to explain these symptoms. Thus, a combined radiologic examination of the pharynx, esophagus, and gastric cardia is appropriate for patients with unexplained pharyngeal dysphagia.

Other patients may have substernal dysphagia with a sensation of blockage or discomfort anywhere from the thoracic inlet to the xiphoid process. This symptom may be caused by esophageal motility disorders or by structural abnormalities of the esophagus or cardia such as esophagitis, rings, strictures, and tumors. When

barium studies are performed on these patients, the esophagram usually consists of a biphasic examination that includes upright double-contrast views with a high-density barium suspension to assess mucosal disease and prone single-contrast views with a low-density barium suspension to assess distensibility and motility.

Optimal evaluation of patients with dysphagia depends on the nature and location of the dysphagia and the clinical setting. The following four scenarios are considered separately:

1. Oropharyngeal dysphagia with an attributable cause
2. Unexplained oropharyngeal dysphagia
3. Substernal dysphagia in immunocompetent patients
4. Substernal dysphagia in immunocompromised patients

Oropharyngeal Dysphagia with an Attributable Cause

When oropharyngeal dysphagia has an attributable cause (e.g., recent stroke, worsening dementia, myasthenia gravis, amyotrophic lateral sclerosis), a modified barium swallow may be performed with the assistance of a speech therapist. The study is facilitated by examining the patient in a speech therapy chair. The modified barium swallow focuses on the oral cavity, pharynx, and cervical esophagus with videofluoroscopy or cine recording to assess abnormalities of both the oral phase of swallowing (e.g., difficulty propelling the bolus) and the pharyngeal phase (e.g., laryngeal penetration, tracheal aspiration, cricopharyngeal dysfunction). It has been shown that the risk of developing aspiration pneumonia is directly related to the degree of swallowing dysfunction on video fluoroscopic studies. The patient may be given high- and low-density barium suspensions as well as other substances of varying consistency (e.g., barium paste or barium-impregnated crackers) to assess the patient's ability to swallow solid or semisolid substances. In conjunction with a speech therapist, various compensatory maneuvers (e.g., a chin-tuck position) may be tried to prevent aspiration or other types of swallowing dysfunction.

Unexplained Oropharyngeal Dysphagia

In patients with unexplained oropharyngeal dysphagia, a more detailed barium study may be performed in order to assess both functional and structural abnormalities of the pharynx. As in the modified barium swallow, a dynamic examination of the pharynx with videofluoroscopy or cine recording permits assessment of both the oral and pharyngeal phases of swallowing. However, static images of the pharynx (e.g., double-contrast spot films of the pharynx in frontal and lateral projections with high-density barium) should also be obtained to detect structural abnormalities (e.g., pharyngeal tumors, Zenker's diverticulum). Because some patients with lesions in the esophagus or at the gastric cardia can have referred dysphagia, the esophagus and cardia should also be carefully evaluated as part of the barium study in these patients, particularly if no abnormalities are found in the pharynx to account for their symptoms (see below). In patients with unexplained pharyngeal dysphagia, it has been shown that the combination of videofluoroscopy and static images of the pharynx and esophagus has a higher diagnostic value than either videofluoroscopy or static images alone.

Substernal Dysphagia in Immunocompetent Patients

The biphasic esophagram is a valuable technique for evaluating substernal dysphagia in immunocompetent patients. This technique permits detection of both structural and functional abnormalities of the esophagus. Perhaps the most important structural lesion is carcinoma of the esophagus or esophagogastric junction. In one study, double-contrast esophagography was found to have a sensitivity of 96% in diagnosing cancer of the esophagus or esophagogastric junction, which is comparable to the reported sensitivity of endoscopy for diagnosing these lesions. In two other large series of patients, endoscopy failed to reveal any cases of esophageal carcinoma that had been missed on the barium studies. The findings in these series suggest that endoscopy is not routinely warranted to rule out missed tumors in patients who have normal findings on radiologic examinations.

While double-contrast views are best for detecting mucosal lesions (e.g., tumors, esophagitis), prone single-contrast views with continuous drinking of a low-density barium suspension are best for detecting lower esophageal rings or strictures. It has been shown that lower esophageal rings are two to three times more likely to be diagnosed on prone single-contrast views than on upright double-contrast views because of inadequate distention of the distal esophagus when the patient is upright. In one study, the biphasic esophagram was found to detect about 95% of all lower esophageal rings, whereas endoscopy detected only 76% of these rings. Similarly, biphasic esophagrams have been found to have a sensitivity of about 95% in detecting peptic strictures, sometimes revealing strictures that are missed with endoscopy.

Alternatively, endoscopy may be performed to evaluate the esophagus for structural abnormalities in patients with dysphagia. It is a highly accurate test for esophageal cancer when multiple endoscopic biopsy specimens and brushings are obtained. It also is more sensitive than double-contrast esophagography for detecting mild reflux esophagitis or other subtle forms of esophagitis. However, endoscopy is a more expensive and invasive test than the barium study. It also is less sensitive than the barium study for detecting lower esophageal rings or strictures (see above) and does not permit evaluation of esophageal motility disorders. For these reasons, the barium study is often recommended, even by gastroenterologists, as the initial diagnostic test for patients with dysphagia.

The biphasic esophagram is also a useful test in patients with esophageal motility disorders causing dysphagia. Videofluoroscopy of discrete swallows of a low-density barium suspension in the prone right anterior oblique position permits detailed assessment of esophageal motility. In various studies, videofluoroscopy has been found to have an overall sensitivity of 80% to 89% and specificity of 79% to 91% for the diagnosing of esophageal motility disorders (e.g., achalasia, diffuse esophageal spasm) in comparison to esophageal manometry. Occasionally, barium studies may even reveal dysmotility not seen at manometry (e.g., some patients with the beaklike distal esophageal narrowing of achalasia are found to have complete relaxation of the lower esophageal sphincter on manometry). In any case, when a significant esophageal motility disorder is detected on a barium study, manometry may be performed to further elucidate the nature of this motility disorder. Alternatively, radionuclide esophageal transit scintigraphy is a simple, noninvasive, and quantitative test of esophageal motility and emptying.

Substernal Dysphagia in Immunocompromised Patients

The major consideration in immunocompromised patients with dysphagia or odynophagia (painful swallowing) is infectious esophagitis, most commonly due to *Candida albicans* or herpes simplex virus. In human immunodeficiency virus (HIV)-positive patients, *Candida* is the cause of esophageal symptoms in the majority of cases, with cytomegalovirus (CMV), herpes simplex, and idiopathic ulcers (also known as HIV ulcers) the other most common etiologies. HIV-positive patients with esophageal symptoms are generally treated empirically with antifungal therapy without undergoing a diagnostic examination. Most gastroenterologists prefer that those with persistent symptoms (or severe symptoms at presentation) be evaluated by endoscopy. Endoscopy is preferred because of the ability to obtain specimens (e.g., histology, cytology, immunostaining and culture).

The endoscopic or radiographic appearance alone does not accurately predict diseases other than *Candida* esophagitis; diagnosis requires the acquisition of specimens for laboratory study. Barium esophagography is preferred in some centers and can be useful in guiding management. Double-contrast esophagography is more accurate than single-contrast esophagography for detecting ulcers or plaques associated with infectious esophagitis. However, single-contrast esophagograms may be performed if the patient is too sick or debilitated to tolerate a double-contrast examination. Patients with radiographically diagnosed *Candida* or herpes esophagitis may be treated with antifungal or antiviral agents without endoscopic evaluation, but endoscopy is warranted for patients with giant esophageal ulcers in order to differentiate CMV and HIV, so that appropriate therapy can be started.

Abbreviations

- Med, medium
- NUC, nuclear medicine
- Tc, technetium

Relative Radiation Level	Effective Dose Estimated Range
None	0
Minimal	<0.1 mSv
Low	0.1-1 mSv
Medium	1-10 mSv
High	10-100 mSv

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Selection of appropriate radiologic imaging procedures for diagnosis and evaluation of patients with dysphagia

POTENTIAL HARMS

Relative Radiation Level (RRL)

Potential adverse health effects associated with radiation exposure are an important factor to consider when selecting the appropriate imaging procedure. Because there is a wide range of radiation exposures associated with different diagnostic procedures, a relative radiation level (RRL) indication has been included for each imaging examination. The RRLs are based on effective dose, which is a radiation dose quantity that is used to estimate population total radiation risk associated with an imaging procedure. Additional information regarding radiation dose assessment for imaging examinations can be found in the American College of Radiology (ACR) Appropriateness Criteria® Radiation Dose Assessment Introduction document (see "Availability of Companion Documents" field).

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made

by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Levine MS, Bree RL, Rosen MP, Foley WD, Gay SB, Grant TH, Heiken JP, Huprich JE, Lalani T, Miller FH, Ros PR, Sudakoff GS, Greene FL, Rockey DC, Expert Panel on Gastrointestinal Imaging. ACR Appropriateness Criteria® dysphagia. [online publication]. Reston (VA): American College of Radiology (ACR); 2007. 6 p. [35 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1998 (revised 2007)

GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

GUIDELINE COMMITTEE

Committee on Appropriateness Criteria, Expert Panel on Gastrointestinal Imaging

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Panel Members: Marc S. Levine, MD; Robert L. Bree, MD, MHSA; Max Paul Rosen, MD, MPH; W. Dennis Foley, MD; Spencer B. Gay, MD; Thomas H. Grant, DO; Jay P. Heiken, MD; James E. Huprich, MD; Tasneem Lalani, MD; Frank H. Miller, MD; Pablo R. Ros, MD, MPH; Gary S. Sudakoff, MD; Frederick L. Greene, MD; Don C. Rockey, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

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The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [American College of Radiology \(ACR\) Web site](#).

ACR Appropriateness Criteria® *Anytime, Anywhere*™ (PDA application). Available from the [ACR Web site](#).

Print copies: Available from the American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- ACR Appropriateness Criteria®. Background and development. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in Portable Document Format (PDF) from the [American College of Radiology \(ACR\) Web site](#).
- ACR Appropriateness Criteria® radiation dose assessment introduction. American College of Radiology. 2 p. Electronic copies: Available from the [American College of Radiology Web site](#).

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on March 19, 2001. The information was verified by the guideline developer on March 29, 2001. This summary was updated by ECRI on July 31, 2002. The updated information was verified by the guideline developer on October 1, 2002. This summary was updated by ECRI on November 17, 2005. This summary was updated by ECRI Institute on June 17, 2009.

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